

WHAT IS CLAIMED IS:

1. A method for separating a rare cell from other cells in a cell population:

- 5 (a) applying cells from the cell population to a surface;
 (b) determining the location of the rare cell on the surface and overlaying
 the cells with a solidifiable material, wherein a cover layer is formed;
 (c) illuminating the cover layer with light focused at the location
 identified in step (b) whereupon a solid plug is formed from the solidifiable material at the
 location; and
 10 (d) removing the solid plug from the surface, wherein the rare cell
 adheres to the solid plug,
 whereupon the rare cell is separated from other cells in the cell
 population.

15 2. A method for analyzing DNA of a rare cell in a cell population comprising:

- (a) applying cells from the cell population to a surface;
 (b) determining the location of the rare cell on the surface and overlaying
 the cells with a solidifiable material, wherein a cover layer is formed;
 (c) illuminating the cover layer with light focused at the location
 20 identified in step (b) whereupon a solid plug is formed from the solidifiable material at the
 location;
 (d) removing the solid plug from the surface, wherein the rare cell
 adheres to the solid plug; and,
 (e) analysing the DNA of the rare cell.

25 3. The method of claim 1 wherein the solidifiable material comprises at least
 one compound selected from the group consisting of ethylene, styrene, substituted styrenes,
 propylene, vinyl, vinyl alcohols, vinyl acetals, methacrylate, urethane, neopentyl glycol
 dimethacrylate, poly bis phenol A-co-epichlorohydrin, epoxy resin, bis-phenol A type
 30 epoxy acrylate oligomer, polyethylene glycol dimethacrylate, penta-erythritol tetracrylate,
 urethane acrylate oligomer, neopentyl glycol dimethacrylate, polyethylene glycol

dimethracrylate, methylphenylglyoxylate, polybutylmethacrylate, and trimethylol trimethacrylate.

4. The method of claim 1 wherein the solidifiable material comprises

5 2,2-dimethoxy-2-phenyl acetophenone or 2,2-diethoxyacetophenone.

5. A method for analyzing DNA of a rare cell in a cell population comprising:

- (a) applying cells from the cell population to a surface;
(b) determining the location of the rare cell on the surface, and overlaying

10 the cells with a solidifiable material, wherein a cover layer is formed,

(c) illuminating the cover layer with light focused at the location identified in step (b), whereupon a solid plug is formed from the solidifiable material at the location;

(d) removing the solidifiable material which is not solidified;

15 (e) treating the surface with a DNA-inactivating agent;

(f) removing the solid plug from the surface to expose the rare cell; and

(g) analyzing the DNA of the rare cell.

6. The method of claim 5 wherein the rare cell is a fetal cell, and the cell
20 population is maternal blood.

7. The method of claim 6 wherein the fetal cell is a nucleated red blood cell.

8. The method of claim 5 wherein the rare cell is a malignant cell.

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9. The method of claim 3 wherein the cell population is in a tissue section.

10. The method of claim 5 wherein the solidifiable material comprises at least one compound selected from the group consisting of ethylene, styrene, substituted styrenes, propylene, vinyl, vinyl alcohols, vinyl acetals, methacrylate, urethane, neopentyl glycol dimethracrylate, poly bis phenol A-co-epichlorohydrin, epoxy resin, bis-phenol A type epoxy acrylate oligomer, polyethylene glycol dimethacrylate, penta-erythritol tetracrylate,

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urethane acrylate oligomer, neopentyl glycol dimethacrylate, polyethylene glycol dimethacrylate, methylphenylglyoxylate, polybutylmethacrylate, and trimethylol trimethacrylate.

- 5 11. The method of claim 5 wherein the solidifiable material comprises
2,2-dimethoxy-2-phenyl acetophenone or 2,2-diethoxyacetophenone.
12. The method of claim 11 wherein the solidifiable material comprises
2,2-dimethoxy-2-phenyl acetophenone.
- 10 ~~13. The method of claim 5 wherein the analysis is carried out after the rare cell
is removed from the surface.~~
14. The method of claim 5 wherein the analysis of the DNA from the rare cell
15 comprises amplifying the DNA of the rare cell.
15. The method of claim 14 wherein the amplification is by the polymerase
chain reaction.
- 20 16. The method of claim 14 wherein the amplification is by the ligase chain
reaction.
- 25 ~~17. The method of claim 14 wherein the amplification is carried out after the
rare cell is removed from the surface.~~
18. A kit comprising instructions describing the method of claim 5 and at least
one of a photoreactive cross-linker, a photoinitiator, and a plastic monomer.
19. A method for amplifying DNA of a rare cell in a cell population comprising:
30 (a) applying cells from the cell population to a surface;
(b) determining the location of the rare cell on the surface, and overlaying
the cells with a photodepolymerizable coating, wherein a cover layer is formed;

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part
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- (c) heating the cover layer to make it solid;
 - (d) illuminating the cover layer with light focused at the location identified in step (b) to solubilize the material at the location;
 - (e) removing the solubilized material; whereupon the rare cell is exposed; and
 - (f) amplifying the DNA of the rare cell.

20. The method of claim 18, wherein the photodepolymerizable coating is a novalak resin.